Description

Method for ensuring the same order of messages in a plurality of data sinks

The invention relates to a method for ensuring the same order of messages in a plurality of data sinks in accordance with the preamble of claim 1. In the case of multicomputer systems, in particular, it is necessary for the receivers, or data sinks, to receive the data messages originating from a plurality of transmitters, or data sources, in the same order. This requires a constrained synchronization of the data sinks.

The invention is based on the object of specifying a method of the generic type in which the data sinks are synchronized in such a way as to ensure the same message order of the data messages in different data sources.

The object is achieved according to the invention by means of the characterizing features of claim 1. The clock generator transmits a broadcast message cyclically, for example at equidistant time intervals of 50 ms. The message comprises a consecutive clock generator number, preferably in the 32-bit format. The current clock generator number is stored in each data source. Before a message is written to the transmission buffer of the data source, this is provided with a message header comprising the current clock generator number and a consecutive message counting number within the clock cycles, preferably in the 8-bit format. As long as the clock generator number has the same value, the message counting number is increased by one upon the generation of the message header. If the data source

receives a new clock generator number from the clock generator, the message counting number is reset to the initialization value. The next time a message is written to the transmission buffer, the message is in turn preceded by the current clock generator number together with the message counting number = 1. On account of the items of information in the message header, namely clock generator number and message counting number, the same order of messages can be established in all the data sinks.

In accordance with claim 2, for this purpose, in the data sinks, in addition to the clock generator number and the message counting number, the sender address is also used for sorting. The sorting instant is determined by the fact that a determined time on the basis of a number of clock cycles, preferably of the order of magnitude of five clock cycles, must have elapsed. This ensures that all data sinks have received at least all messages with the oldest clock generator numbers.

In an advantageous embodiment characterized in claim 3, the cycle time of a central clock generator may be lengthened by only using said central clock generator to synchronize the clock generators assigned to each individual data source. In this case, for the sake of simplicity, the cycle time of the central clock generator is an integral multiple of the cycle time of the clock generators assigned to the data sources. The current value of the internal clock generator of the data source is then entered in the message header.

The invention is explained in more detail below on the basis of figurative illustrations, in which:

Figure 1 shows a schematic illustration of a communication structure, and

Figure 2 shows a message construction for ensuring the same order of messages in the case of a communication structure in accordance with figure 1.

Figure 1 shows three data sources DQ that transmit identical message contents to four data sinks DS in parallel, but independently of one another.

In order to ensure that the data messages arrive at the data sinks DS in the same order as they are generated by the data sources DQ, a special message construction is provided, which is illustrated in figure 2.

For this purpose, each individual message N is preceded by a message header NK. Said message header NK comprises a clock generator number TG-Nr. and a message counting number TZ. The clock generator number TG-Nr. is generated by a clock generator TG incorporated into the network and is communicated synchronously to all the data sources DQ (Figure 1). In addition, a plurality of message counting numbers TZ, for example five in each case, are generated per clock generator number TG-Nr. When the next clock generator number TG-Nr. is present, the message counting number TZ is reset to one and restarted. In this way, the data sinks DS for which the messages N are intended are able, on the basis of the sender address, the clock generator number TG-Nr. and the message counting number TZ, to sort all incoming messages N in the same order.

The invention is not restricted to the exemplary embodiment mentioned above. Rather, a number of variants are conceivable which make use of the features of the invention

even with an embodiment of a fundamentally different configuration.